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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,110	09/22/2006	Takayuki Yamada	TOW-163US	7262
959	7590	06/08/2010		
LAHIVE & COCKFIELD, LLP FLOOR 30, SUITE 3000 ONE POST OFFICE SQUARE BOSTON, MA 02109			EXAMINER	
			CHUO, TONY SHENG HISLNG	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/594,110	<b>Applicant(s)</b> YAMADA, TAKAYUKI
	<b>Examiner</b> Tony Chuo	<b>Art Unit</b> 1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 07 April 2010.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-6 and 8-15 is/are pending in the application.  
 4a) Of the above claim(s) 8-14 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-6 and 15 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 07 April 2010 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Response to Amendment***

1. Claims 1-6 and 8-15 are currently pending. Claim 7 has been cancelled. Claims 8-14 are withdrawn from further consideration as being drawn to a non-elected invention. New claim 15 has been added. The previous objection to the drawings is withdrawn. The amended claim 1 does overcome the previously stated 102 and 103 rejections. However, upon further consideration, claims 1-6 and 15 are rejected under the following new 103 rejections. This action is made FINAL as necessitated by the amendment.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Ukai et al (US 2004/0072060).

The applicant's admitted prior art discloses an electrolyte electrode assembly sandwiched between a pair of separators "6a" & "6b", wherein the electrolyte electrode assembly comprises an anode "3", a cathode "4", and an electrolyte "2" interposed

between the anode and cathode, wherein bosses "7a" & "7b" are formed on the pair of separators (See specification, page 1, lines 15-25 and Figure 6).

However, the applicant's admitted prior art does not expressly teach a layer is provided between the cathode and the bosses on one of the separators, the layer comprising material which has electron conductivity higher than that of the cathode, and which is capable of inducing oxygen reduction; wherein the layer comprises a complex oxide containing at least a rare-earth element A, a transitional metal element C, and oxygen O; wherein the rare-earth element A comprises at least one element selected from the group consisting of La, Sm, Nd, and Pr, and the transitional metal element C comprises at least one element selected from the group consisting of Co, Fe, Ni, Cr, Mn, Ga and Ti; wherein the layer further contains an alkaline-earth metal element B, and composition formula of material of the layer is  $A_xB_{1-x}CO_3$  ( $0.5 \leq x \leq 1.0$ ); wherein the rare-earth element A comprises at least one element selected from the group consisting of La, Sm, Nd, and Pr, the transitional metal element C comprises at least one element selected from the group consisting of Co, Fe, Ni, Cr, Mn, Ga and Ti, and the alkaline-earth metal element B comprises at least one element selected from the group consisting of Ca, Sr, and Ba; wherein the layer comprises a perovskite complex oxide; and wherein the layer has a thickness of less than  $10 \mu\text{m}$ .

The Ukai reference discloses a solid oxide fuel cell comprising an air electrode contact layer that is provided between the air electrode (cathode) and the separator, wherein the air electrode contact layer comprises  $\text{La}_{1-x}\text{Sr}_x\text{CoO}_3$ , wherein  $0.1 \leq x \leq 0.5$ , wherein the air electrode contact layer shows higher electric conductivity than that of the

air electrode, wherein the air electrode contact layer inherently is capable of inducing oxygen reduction and is a perovskite complex oxide, and wherein the air electrode contact layer has a thickness of 10 to 50  $\mu\text{m}$  (See paragraphs [0085],[0087],[0101]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Applicant's admitted prior art to include a layer is provided between the cathode and the bosses on one of the separators, the layer comprising material which has electron conductivity higher than that of the cathode, and which is capable of inducing oxygen reduction; wherein the layer comprises a complex oxide containing at least a rare-earth element A, a transitional metal element C, and oxygen O; wherein the rare-earth element A comprises at least one element selected from the group consisting of La, Sm, Nd, and Pr, and the transitional metal element C comprises at least one element selected from the group consisting of Co, Fe, Ni, Cr, Mn, Ga and Ti; wherein the layer further contains an alkaline-earth metal element B, and composition formula of material of the layer is  $A_xB_{1-x}CO_3$  ( $0.5 \leq x \leq 1.0$ ); wherein the rare-earth element A comprises at least one element selected from the group consisting of La, Sm, Nd, and Pr, the transitional metal element C comprises at least one element selected from the group consisting of Co, Fe, Ni, Cr, Mn, Ga and Ti, and the alkaline-earth metal element B comprises at least one element selected from the group consisting of Ca, Sr, and Ba; wherein the layer comprises a perovskite complex oxide in order to improve current collecting efficiency and to reduce contact resistance between the cathode and the separator, thereby improving the generating performance of the SOFC (See paragraph [0087]). In addition, it would have

been obvious to one of ordinary skill in the art at the time the invention was made to modify the Applicant's admitted prior art/Ukai electrolyte electrode assembly to include a layer having a thickness of less than 10  $\mu\text{m}$  because even if range of prior art and claimed range do not overlap, obviousness may still exist if the ranges are close enough that one would not expect a difference in properties. *In re Woodruff* 16 USPQ 2d 1934 (Fed. Cir. 1990); *Titanium Metals Corp. v. Banner* 227 USPQ 773 (Fed. Cir. 1985); *In re Aller* 105 USPQ 233 (CCPA 1955). In addition, there is no evidence of criticality or unexpected results of the claimed range of thickness of the layer.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Ukai et al (US 2004/0072060) as applied to claim 1 above.

However, Applicant's admitted prior art as modified by Ukai et al does not expressly teach a layer having a thickness in the range of 1  $\mu\text{m}$  to 5  $\mu\text{m}$ .

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Applicant's admitted prior art/Ukai electrolyte electrode assembly to include a layer having a thickness in the range of 1  $\mu\text{m}$  to 5  $\mu\text{m}$  because result effective variables were held to have been obvious (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)). Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The thickness of the layer is a result effective variable of minimizing the

resistance of the layer. In addition, there is no evidence of criticality or unexpected results of the claimed range of thickness of the layer.

***Response to Arguments***

5. Applicant's arguments filed 4/7/10 have been fully considered but they are not persuasive.

The applicant argues that in the Ukai reference, both sides of a single cell, i.e., the air electrode contact layer side and the fuel electrode contact layer side are sandwiched between Pt meshes, as described at paragraph [0128] and shown in FIG. 2 of the Ukai reference. To increase electrical conductivity, because the Pt meshes need to partially bury in each of the contact layers so as to tightly contact with the contact layers, the contact layers preferably have the thickness of 20 to 30  $\mu\text{m}$ .

In response, the examiner disagrees that Pt meshes need to partially bury in each of the contact layers so as to tightly contact with the contact layers, wherein the contact layers preferably have a thickness of 20 to 30  $\mu\text{m}$ . Nowhere in the Ukai reference does it teach Pt meshes that need to partially bury in each of the contact layers.

Further, the applicant argues that the air electrode contact layer functions to bridge the gap generated between the air electrode and the separator, as described at paragraph [0086] of the Ukai reference. Thus, a favorable adhesion condition is maintained and microscopic asperities on the separator are absorbed. For this

purpose, the air electrode contact layer of the Ukai reference requires a certain thickness (most preferably 20 to 30  $\mu\text{m}$ ).

In response, the examiner disagrees that the Ukai reference teaches that the air electrode contact requires a certain thickness (most preferably 20 to 30  $\mu\text{m}$ ) in order to maintain a favorable adhesion condition. The Ukai reference discloses that the thickness of the air electrode contact layer is preferably within 10 to 50  $\mu\text{m}$  (See paragraph [0101]).

Further, the applicant argues that in contrast, in the present invention, the object of providing the electron diffusion layer is to reduce contact resistance between a separator having bosses and a cathode, in order to facilitate conduction between the bosses and the cathode.

In response, the examiner would like to point out that Ukai et al discloses the same motivation for providing an air electrode contact layer (electron diffusion layer) which is to reduce the contact resistance between the air electrode (cathode) and the separator (bosses) (See paragraph [0087]).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Michener can be reached on (571) 272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Jonathan Crepeau/  
Primary Examiner, Art Unit 1795